

Claims

1. A method for monitoring hydrogen gas and a hydrogen flame, wherein an object light having a wavelength of about 309 nm and resulting from two or more laser beams, which have been irradiated to a space to be monitored, is collected and converted to an electronic image, and the electronic image is amplified and converted back to an optical image, thereby imaging a spatial intensity distribution of light at a specific wavelength.
2. The method for monitoring hydrogen gas and a hydrogen flame according to Claim 1, wherein the laser beams are emitted from a laser beam source with at least one wavelength of about 355 nm and a laser beam source with at least one wavelength of about 416 nm.
3. The method for monitoring hydrogen gas and a hydrogen flame according to Claim 1 or 2, wherein the laser beams are each irradiated in the form of a pulse, and reception of the object light is turned on/off in sync with a laser beam irradiation pulse to collect the object light only in a time zone during which the object light is emitted.
4. The method for monitoring hydrogen gas and a hydrogen flame according to any one of Claims 1 to 3, wherein a dye laser, a titanium sapphire laser, an optical parametric oscillation laser, or a hydrogen Raman cell is used as said laser beam source of about 416 nm.
5. The method for monitoring hydrogen gas and a hydrogen flame according to any one of Claims 1 to 4, wherein a background image of the space to be monitored is picked up, and the background image is imposed on the image of the spatial intensity distribution of light at the specific wavelength.

6. The method for monitoring hydrogen gas and a hydrogen flame according to Claim 5, wherein the background image is picked up with an imaging process insensitive to wavelengths of 309 nm, 355 nm and 416 nm.

7. The method for monitoring hydrogen gas and a hydrogen flame according to any one of Claims 1 to 6, wherein the hydrogen gas is monitored when the laser beams are irradiated, and the hydrogen flame is monitored when the laser beams are not irradiated.

8. A device for monitoring hydrogen gas and a hydrogen flame, the device comprising:

two or more laser beam sources,

means for collecting an object light having a wavelength of about 309 nm and resulting from laser beams irradiated to a space to be monitored,

image producing means for converting the object light to an electronic image, amplifying the electronic image, and converting back the amplified electronic image to an optical image, and

means for imaging a spatial intensity distribution of light at a specific wavelength.

9. The device for monitoring hydrogen gas and a hydrogen flame according to Claim 8, wherein said two or more laser beam sources are a laser beam source with at least one wavelength of about 355 nm and a laser beam source with at least one wavelength of about 416 nm.

10. The device for monitoring hydrogen gas and a hydrogen flame according to Claim 8 or 9, wherein each of said laser beam sources irradiates the laser beam in the form of a pulse, and

reception of the object light is turned on/off by an image intensifier in sync with a laser beam irradiation pulse to collect the object light only in a time zone during which the object light is emitted.

11. The device for monitoring hydrogen gas and a hydrogen flame according to any one of Claims 8 to 10, wherein a dye laser, a titanium sapphire laser, an optical parametric oscillation laser, or a hydrogen Raman cell is used as said laser beam source of about 416 nm.

12. The device for monitoring hydrogen gas and a hydrogen flame according to any one of Claims 8 to 11, further comprising:

means for picking up a background image, and

means for superimposing the background image picked up by said image pickup means on the image of the spatial intensity distribution of light at the specific wavelength.

13. The device for monitoring hydrogen gas and a hydrogen flame according to Claim 12, wherein said image pick-up means is insensitive to wavelengths of 309 nm, 355 nm and 416 nm.

14. The device for monitoring hydrogen gas and a hydrogen flame according to any one of Claims 8 to 13, wherein the hydrogen gas is monitored when the laser beams are irradiated, and the hydrogen flame is monitored when the laser beams are not irradiated.